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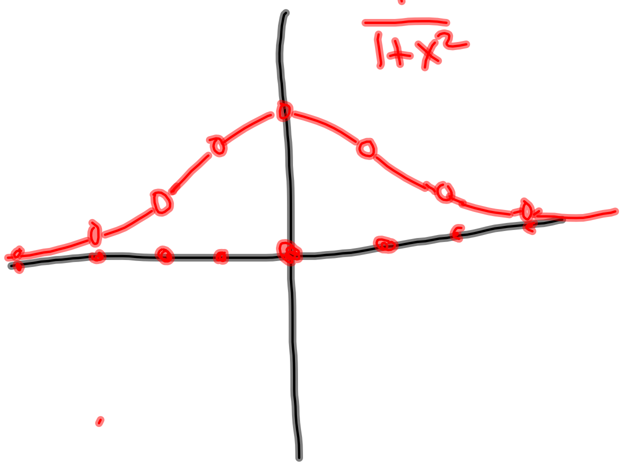
2.1/17) c) $f(x) = \begin{cases} 0, & x \text{ an integer} \\ \neq 0, & x \text{ anything else} \end{cases}$

ii) $\lim_{x \to -\infty} f(x) = 0$; $\lim_{x \to +\infty} f(x) = 0$

$\frac{1}{1+x^2}$



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19) $\lim_{x \to 1} \frac{x-1}{x^3-1}$; $x = 2, 1.5, 1.1, 1.01, 1.001$

$0, 0.5, 0.9, 0.99, 0.999$

2.2) $\lim_{x \to 1} \frac{x-1}{x^3-1} = \lim_{x \to 1} \frac{(x-1)}{(x-1)(x^2+x+1)}$

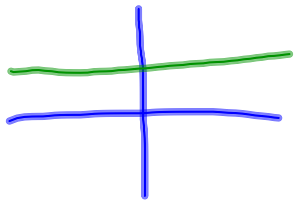
$= \lim_{x \to 1} \frac{1}{x^2+x+1} = \frac{1}{1+1+1} = \frac{1}{3}$

$\lim_{x \to a} 1 = 1$

$c \quad c$

$\lim_{x \to a} n = n$

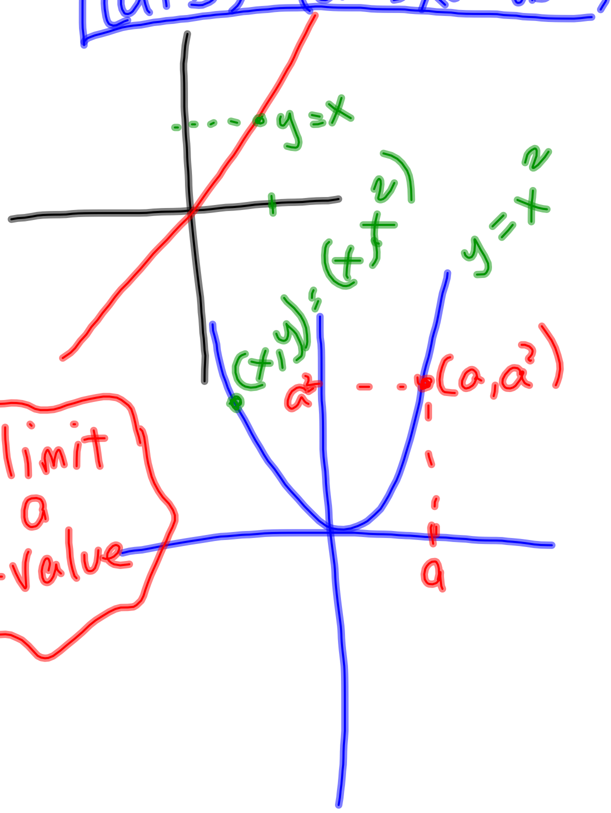
$x \to a, \ -\infty, \ +\infty$



$(a^3-b^3) = (a-b)(a^2+ab+b^2)$

$\boxed{(a^3+b^3) = (a+b)(a^2-ab+b^2)}$

$\lim_{x \to a} x = a$



$\lim_{x \to a} x^2 = a^2$

$\lim_{x \to a} x^n = a^n$

A limit is a y-value

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$$\lim_{x \to 2} \frac{1}{x^2+x+1} = \frac{1}{(2)^2+(2)+1} = \frac{1}{4+2+1} = \frac{1}{7}$$

$$f(x) = x^2+x+1$$

$$f(3) = (3)^2+(3)+1$$

function notation is really "placeholder" notation

$$f(4-y) = (4-y)^2+(4-y)+1$$

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29) a] $\lim_{x\to\infty} x\sin\left(\frac{1}{x}\right)$

$y_2 = x\sin(1/x)$

9, 99, 999, ...

Indeterminate form "$\infty\cdot 0$"

use the substitution $t=\frac{1}{x}$ ✯ and see what happen

If $t=\frac{1}{x}$ then

$xt=1$ and

$x=\frac{1}{t}$ ✯✯

$\lim_{x\to\infty}\left(\frac{1}{t}\right)\sin(t)$

If $x\mapsto\infty$

and $t=\frac{1}{x}$

then what happens

to t?

i.e. $\lim_{x\to\infty}\frac{1}{x}=0$ ✯

$\lim_{t\to 0^+}\frac{1}{t}\sin t$

1

radian mode

.01745

degree mode

$\frac{\pi}{180}=$

✯!

$\lim_{x\to 0}\frac{\sin x}{x}=1$